

CURRICULUM VITAE

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1. ACADEMIC DEGREES

- Degree In Chemistry (BSC). Autónoma University of Madrid (Spain). 1982.
- Ph. D. In Chemistry. Autónoma University of Madrid. 1987. *Cum Laude*

2. PROFESSIONAL EMPLOYMENTS AND RESEARCH EXPERIENCE

- **1985-1987.** Graduent Student. Fellow of the MEC. Organic Chemistry Institute. CSIC. Supervisor: Dr. Manuel Martín-Lomas.
- **1988.** Postdoctoral Fellow, École Normale Supérieure, Paris. Supervisor: Dr. Pierre Sinaÿ
- **1989.** Posdoctoral Fellow. Massachusetts Institute of Technology. Supervisor: Dr. A.M. Klibanov
- **1990-2002.** Tenure Scientist at the Department of Biological Chemistry, Institute of Organic Chemistry, C.S.I.C. Madrid (Spain).
- **1991 (4 months).** Visiting Scientist at the Chemical Center, Lund (Sweden). Supervisor: Dr. K. G. I. Nilsson.
- **2002-.** Scientific Researcher at the Department of Biological Chemistry, Institute of Organic Chemistry, C.S.I.C. Madrid (Spain).

3. MAIN RESEARCH INTEREST

Carbohydrate chemistry. Synthesis of glycoconjugates with biological significance. Use of enzymes in organic synthesis.

4. PUBLICATIONS

A. Fernández-Mayoralas y M. Martín-Loma. Synthesis of 3-O-methyl and 4-O-methyltetra-O-acetyl- α -D-galactopyranose. *Anal. Quim.*, 80C (1984) 184-185.

A. Fernández-Mayoralas, M. Martín-Lomas y D. Villanueva. 4-O- β -D-Galactopyranosyl-3-O-methyl-D-glucose: a new synthesis and application to the evaluation of intestinal lactase. *Carbohydr. Res.*, 140 (1985) 81-91.

M. Alonso-López, M. Bernabé, A. Fernández-Mayoralas, J. Jiménez-Barbero, M. Martín-Lomas y S. Penadés. Chiral macrocyclic compounds from lactose derivatives. *Carbohydr. Res.*, 150 (1986) 103-109.

A. Fernández-Mayoralas y M. Martín-Lomas. Synthesis of 3 and 2'-fucosyllactose and 3,2'-difucosyllactose from partially benzylated lactose derivatives. *Carbohydr. Res.*, 154 (1986) 93-101.

M. L. Jimeno, A. Fernández-Mayoralas, M. Martín-Lomas y A. Alemany. ^{13}C -NMR studies of peracetylated derivatives of O- α and O- β -D-galactopyranosyl-(1 \rightarrow 3) and (1 \rightarrow 4)- α -galactopyranose. *Carbohydr. Res.*, 161 (1987) 144-149.

M. Alonso-López, J. Barbat, E. Fanton, A. Fernández-Mayoralas, J. Gelas, D. Horton, M. Martín-Lomas, S. Penadés. The acetonation of lactose and benzyl β -lactoside with 2-methoxypropene. *Tetrahedron*, 43 (1987) 1169-1176.

- S. David y A. Fernández-Mayoralas. Nouvelle voie d'accès à la configuration β -D-mannopyranoside protégée temporairement en position 3 et 6. *Carbohydr. Res.*, 165 (1987) C11-C13.
- C. Jaramillo, A. Fernández-Mayoralas y M. Martín-Lomas. The acetonation of methyl β -maltoside with 2-methoxypropene. *Carbohydr. Res.*, 182 (1988) 153-158.
- A. Fernández-Mayoralas, M. Bernabé, M. Martín-Lomas. The regioselectivity of dibutylstannylene mediated oxidation of methyl 3',4'-O-isopropylidene- β and α -lactoside. A new synthesis of N-acetyllactosamine. *Tetrahedron*, 44 (1988) 4877-4882.
- A. Fernández-Mayoralas, A. Marra, M. Trumtel, A. Veyrieres y P. Sinay. Convenient synthesis of substituted pyranoid glycals from thiophenyl glucosides and glycosyl phenylsulfones. *Tetrahedr. Lett.*, 30 (1989) 2537-2540.
- A. Fernández-Mayoralas, A. Marra, M. Trumtel, A. Veyrieres y P. Sinay. Preparation of pyranoid glycal derivatives from phenyl thioglycosides and glycosyl phenylsulfones. *Carbohydr. Res.*, 188 (1989) 81-95.
- M. Bernabé, A. Fernández-Mayoralas, J. Jiménez-Barbero, M. Martín-Lomas y A. Rivera. The conformation of eight-membered 3,2'-O-isopropylidene acetals of some common disaccharides. *J. Chem. Soc., Perkin Trans. II*, (1989) 1867-1873.
- T. Desai, A. Fernández-Mayoralas, J. Gigg, R. Gigg y S. Payne. The synthesis and resolution of 1,5,6-tri-O-benzyl-myo-inositol. *Carbohydr. Res.*, 205 (1990) 105-123.
- T. Desai, A. Fernández-Mayoralas, J. Gigg, R. Gigg, C. Jaramillo, S. Payne, S. Penadés y N. Schnetz. Preparation of optically active myo-inositol derivatives as intermediates for the synthesis of inositol phosphates. *ACS Symposium Series*, Washington, DC (1991) 86-102.
- E. Rubio, A. Fernández-Mayoralas y A. M. Klivanov. Effect of the solvent on enzyme regioselectivity. *J. Am. Chem. Soc.*, 113 (1991) 695-696.
- E. Domínguez, J. C. Carretero, A. Fernández-Mayoralas y S. Conde. An efficient preparation of optically active (E)- γ -hydroxy- α,β -unsaturated phenylsulfones using lipase-mediated acylations. *Tetrahedr. Lett.*, 32 (1991) 5159-5162.
- K. G. I. Nilsson y A. Fernández-Mayoralas. α -D-Galactosidase-catalysed synthesis of partially protected \square -linked digalactopyranosides. *Biotechnol. Lett.*, 13 (1991) 715-720.
- R. López, A. Fernández-Mayoralas, M. Martín-Lomas y J. M. Guisán. Enzymatic β -galactosidation of β -xylopyranosides. *Biotechnol. Lett.*, 13 (1991) 705-710.
- A. Rivera-Sagredo, A. Fernández-Mayoralas, J. Jiménez-Barbero, M. Martín-Lomas, D. Villanueva y J. J. Aragón. 4-O- β -D-Galactopyranosyl-D-xylose: A new synthesis and application to the evaluation of intestinal lactase. *Carbohydr. Res.*, 228 (1992) 129-135.
- F. F. Santos-Benito, M. Nieto-Sampedro, A. Fernández-Mayoralas y M. Martín-Lomas. Synthesis of oligosaccharide inhibitors of neural cell division. *Carbohydr. Res.*, 230 (1992) 185-190.
- R. López y A. Fernández-Mayoralas. Controlling yield and regioselectivity in the enzymatic synthesis of β -D-galactopyranosyl- β -D-xylopyranosides. *Tetrahedr. Lett.*, 33 (1992) 5449-5452.
- F. F. Santos-Benito, A. Fernández-Mayoralas, M. Martín-Lomas y M. Nieto-Sampedro. Inhibition of proliferation of normal and transformed neural cells by blood group-related oligosaccharides. *J. Exp. Med.*, 176 (1992) 915-918.
- T. Desai, A. Fernández-Mayoralas, J. Gigg, R. Gigg y S. Payne. The preparation of phosphorylated intermediates for the synthesis of racemic and chiral myo-inositol 1,4,5-trisphosphate and its phosphorothioimidate analogues. *Carbohydr. Res.*, 234 (1992) 157-175.
- J. J. Aragón, A. Fernández-Mayoralas, J. Jiménez-Barbero, M. Martín-Lomas, A. Rivera-Sagredo y D. Villanueva. Evaluation of rat intestinal lactase in vivo with 4-galactosylxylose. *Clin. Chim. Acta*, 210 (1992) 221-226.
- R. López, C. Pérez, A. Fernández-Mayoralas y S. Conde. Enzymatic transesterification of alkyl 2,3,4-tri-O-acyl- \square -D-Xylopyranosides. *J. Carbohydr. Chem.*, 12 (1993) 165-171.
- J. M. Guisán, V. Rodríguez, G. Soler, C. Santana, R. Fernández-Lafuente, A. Batisda, C. M. Rosell, R. López, A. Fernández-Mayoralas y M. Martín-Lomas. Synthesis of pharmaceutical oligosaccharides

catalyzed by immobilized-stabilized derivatives of different β -galactosidases. *J. Mol. Cat.*, 84 (1993) 373-379.

J. L. Asensio, R. López, A. Fernández-Mayoralas y J. Jiménez-Barbero. Conformational studies on β -galactopyranosyl-(1 \rightarrow 3) and (1 \rightarrow 4)-xylopyranosides by NMR, molecular mechanics, molecular dynamics, and semiempirical calculations. *Tetrahedron*, 50 (1994) 6417-6432.

K. Singh, A. Fernández-Mayoralas y M. Martín-Lomas. Synthesis of oligosaccharides structurally related to E-selectin ligands. *J. Chem. Soc., Chem. Commun.*, (1994), 775-776.

R. López, A. Fernández-Mayoralas. Enzymatic α -galactosidation of modified monosaccharides: Study of the enzyme selectivity for acceptor and its application to the synthesis of disaccharides. *J. Org. Chem.*, 59 (1994), 737-745.

R. López, E. Montero, F. Sánchez, J. Cañada y A. Fernández-Mayoralas. Regioselective acetylation of alkyl β -D-xylopyranosides by use of lipase PS in organic solvents and application to the chemoenzymatic synthesis of oligosaccharides. *J. Org. Chem.*, 59 (1994), 7027-7032.

J. M. Coterón, K. Singh, J. L. Asensio, M. Domínguez-Dalda, A. Fernández-Mayoralas, J. Jiménez-Barbero, M. Martín-Lomas, J. Abad-Rodríguez y M. Nieto-Sampedro. Oligosaccharides structurally related to E-selectin ligands are inhibitors of neural cell division: Synthesis, conformational analysis, and biological activity. *J. Org. Chem.*, 60 (1995) 1502-1519.

B. Aguilera y A. Fernández-Mayoralas. Nucleophilic displacements on a cyclic sulphamidate derived from allosamine: Application to the synthesis of thio-oligosaccharides. *Chem. Commun.*, (1996) 127-128.

M. Nieto-Sampedro, C. Bailón, A. Fernández-Mayoralas, M. Martín-Lomas, B. Mellstrom y J. R. Naranjo. Experimental brain tumors: Growth arrest and destruction induced by a blood group-related tetrasaccharide. *J. Neuropath. Exp. Neur.*, 55 (1996) 169-177.

J. J. Aragón, F. J. Cañada, A. Fernández-Mayoralas, R. López, M. Martín-Lomas, D. Villanueva. A direct enzymatic synthesis of β -D-galactopyranosyl-D-xylopyranosides and their use to evaluate rat intestinal lactase activity *in vivo*. *Carbohydr. Res.*, 290 (1996) 209-216.

A. Fernández-Mayoralas. Synthesis and modification of carbohydrates using glycosidases and lipases. *Top. Curr. Chem.*, 186 (1997) 1-20.

M. Carpintero, A. Fernández-Mayoralas, C. Jaramillo. Protecting group-directed diastereoselective samarium diiodide-promoted carbocyclization: Application to the synthesis of cyclitols. *J. Org. Chem.* 62 (1997) 1916-1917.

B. Aguilera, A. Fernández-Mayoralas, C. Jaramillo. Use of cyclic sulfamidates derived from D-allosamine in nucleophilic displacement: Scope and limitations. *Tetrahedron*, 53 (1997) 5863-5876.

N. Khair, I. Alonso, N. Rodríguez, A. Fernández-Mayoralas, J. Jiménez-Barbero, O. Nieto, F. Cano, C. Foces-Foces, M. Martín-Lomas. Chemical and enzymatic diastereoselective cleavage of β -D-galactopyranosylsulfoxides. *Tetrahedron Lett.*, 38 (1997) 8267-8270

E. Montero, J. Alonso, F. J. Cañada, A. Fernández-Mayoralas, M. Martín-Lomas. Regioselectivity of the enzymatic transgalactosidation of D- and L-xylose catalysed by β -galactosidase. *Carbohydr. Res.*, 305 (1998) 383-391.

B. Aguilera, A. Fernández-Mayoralas. Synthesis of a thio-analogue of Lewis X by regioselective opening of cyclic sulfamidates. *J. Org. Chem.*, 63 (1998) 2719-2723.

B. Aguilera, J. Jiménez-Barbero, A. Fernández-Mayoralas. Conformational differences between Fuc(1-3)GlcNAc and its thioglycoside analogue. *Carbohydr. Res.*, 308 (1998) 19-27.

C. Jaramillo, G. Corrales, A. Fernández-Mayoralas. Glycosyl phenyl sulfoxides as a source of glycosyl carbanions: Stereoselective synthesis of C-fucosides. *Tetrahedron Lett.*, 39 (1998) 7783-7786.

B. Aguilera, L. Romero-Ramírez, J. Abad-Rodríguez, G. Corrales, M. Nieto-Sampedro, A. Fernández-Mayoralas. Novel disaccharide inhibitors of human glioma cell division. *J. Med. Chem.*, 41 (1998), 4599-4606.

A. Fernández-Mayoralas Enzymatic synthesis of lactose analogues using glycosidases. In "Carbohydrate mimics", VCH, Weinheim, 1998, págs. 511-521 .

J. L. Asensio, F. J. Cañada, A. García, M. T. Murillo, A. Fernández-Mayoralas, B. A. Johns, J. Kozak, Z. Zhu, C. R. Johnson, J. Jiménez-Barbero. Conformational behaviour of aza-C-glycosides: Experimental

demonstration of the relative role of the exo-anomeric effect and 1,3-type interactions in controlling the conformation of regular glycosides. *J. Am. Chem. Soc.*, 121 (1999) 11318-11329.

M. Carpintero, C. Jaramillo, A. Fernández-Mayoralas. Stereoselective Synthesis of Carba- and C-Glycosyl Analogs of Fucopyranosides. *Eur. J. Org. Chem.*, (2000) 1285-1296.

C. Fernández, O. Nieto, J. A. Fontenla, E. Rivas, A. Fernández-Mayoralas. Synthesis and biological studies of glycosyl-dopamine derivatives as potential antiparkinsonian agents. *Carbohydr. Res.*, 327 (2000) 353-365.

J. M. Coterón, J. L. Chiara, A. Fernández-Mayoralas, J. M. Fiandor, N. Valle. Stereocontrolled glycosylation of sordaricin in the presence of ammonium salts. *Tetrahedron Lett.*, 41 (2000) 4373-4377.

J. M. Bueno, J. M. Coterón, J. L. Chiara, A. Fernández-Mayoralas, J. M. Fiandor, N. Valle. Stereoselective synthesis of the antifungal GM222712. *Tetrahedron Lett.*, 41 (2000) 4379-4382.

J. Abad-Rodríguez, M. Bernabé, L. Romero-Ramírez, M. Vallejo-Cremades, A. Fernández-Mayoralas, M. Nieto-Sampedro. Purification and structure of neurostatin, an inhibitor of astrocyte division of mammalian brain. *J. Neurochem.*, 74 (2000) 2547-2556.

G. Corrales, A. Fernández-Mayoralas, E. García-Junceda, Y. Rodríguez. A new strategy for liquid-phase synthesis of disaccharides based on the use of glycosidases. *Biocat. Biotrans.*, 18 (2000) 271-281.

R. De Santiago, A. Fernández-Mayoralas, E. García-Junceda. Enzymatic synthesis of disaccharides by β -galactosidase-catalyzed glycosylation of a glycocluster. *J. Mol. Cat. B: Enzymatic*, 11 (2000), 71-79.

M. Carpintero, A. Fernández-Mayoralas, J. Jiménez-Barbero. The conformational behaviour of fucosyl and carba-fucosyl mimetics in the free and in the protein bound state. *Eur. J. Org. Chem.*, (2001), 681-689.

M. Carpintero, I. Nieto, A. Fernández-Mayoralas. Stereoselective synthesis of α - and β -C-glycosides from glycosyl sulfoxides: Scope and limitations. *J. Org. Chem.*, 66 (2001) 1768-1774.

A. Bastida, A. Fernández-Mayoralas, R. Gómez, F. Iradier, J. C. Carretero, E. García-Junceda. Heterologous over-expression of α -1,6-fucosyltransferase from *Rhizobium* sp. Application to the synthesis of the trisaccharide β -D-GlcNAc(1-4)-(α -L-fuc-(1-6))-D-GlcNAc, study of the acceptor specificity, and evaluation of polyhydroxylated indolizidenes as inhibitors. *Chem. Eur. J.*, 7 (2001) 2390-2397.

C. Alhambra, J. Castro, J. L. Chiara, E. Fernández, A. Fernández-Mayoralas, J. M. Fiandor, S. García-Ochoa, M. D. Martín-Ortega. An improved two-resin method for the cleavage of tertiary amines from REM resins. *Tetrahedron Lett.*, 42 (2001) 6675-6678.

M. Carpintero, A. Bastida, E. García-Junceda, J. Jiménez-Barbero, A. Fernández-Mayoralas. Synthesis of carba- and C-fucopyranosides and their evaluation as α -fucosidase inhibitors. Analysis of unusual conformation adopted by an amino-C-fucopyranoside. *Eur. J. Org. Chem.*, (2001) 4127-4135.

A. Bastida, A. Fernández-Mayoralas, E. García-Junceda. C-Terminal truncation of α -1,6-fucosyltransferase from *Rhizobium* sp. does not annul the transferase activity of the enzyme. *Bioorg. Med. Chem.*, 10 (2002) 737-742.

G. A. Abraham, A. Gallardo, J. San Román, G. Domenech, A. Fernández-Mayoralas, M. Zurita, J. Vaquero. Graft copolymers of poly(ϵ -caprolactone) onto acrylic backbones as suitable polymer matrices for releasing a glycoside antitumoral drug. *J. Biomed. Mat. Res.*, 64A (2003) 638-647.

A. Fernández-Mayoralas, N. de la Figuera, M. Zurita, J. Vaquero, G. A. Abraham, J. San Román, M. Nieto-Sampedro. Central neural tumor destruction by controlled release of a synthetic glycoside dispersed in a biodegradable polymeric matrix. *J. Med. Chem.*, 46 (2003) 1286-1288.

C. De Torres, A. Fernández-Mayoralas. Chemoenzymatic polymer-supported liquid phase synthesis of glucose γ -aminobutyric acid. *Tetrahedron Lett.*, 44 (2003) 2383-2385.

C. Fernández, O. Nieto, J. A. Fontenla, E. Rivas, M. L. De Ceballos, A. Fernández-Mayoralas. Synthesis of glycosyl derivatives as dopamine prodrugs: Interaction with glucose carrier GLUT-1. *Org. Biomol. Chem.*, 1 (2003) 767-77.

C. De Torres, A. Fernández-Mayoralas. Lipase-catalyzed regioselective acetylations and deacetylations of MeOPEG-bound xylopyranosides. *Let. Org. Chem.*, 1 (2004) 99-101.

E. García-Junceda, J. F. García, A. Bastida, A. Fernández-Mayoralas. Enzymes in the synthesis of bioactive compounds: the prodigious decades. *Bioorg. Med. Chem.* 12 (2004) 1817-1834.

- M. Nieto-Sampedro, E. Doncel, A. Fernández-Mayoralas. Natural, synthetic and semisynthetic glycolipid inhibitors of glioma growth. *Expert Opin. Ther. Pat.*, 14 (2004) 487-497.
- F. Calderón, M. Carpintero, E. García-Junceda, A. Fernández-Mayoralas, A. Bastida. Structure/activity relationship of carba and C-fucopyranosides as inhibitors of α -1,6-fucosyltransferases by molecular modelling and kinetic studies. *Lett. Org. Chem.*, 2 (2005) 247-254.
- F. Calderón, R. Fernández, F. Sánchez, A. Fernández-Mayoralas. Asymmetric Aldol Reaction Using Immobilized Proline on Mesoporous Support. *Adv. Synth. Catal.*, 347 (2005) 1395-1403.
- C. Hermida, G. Corrales, O. Martínez-Costa, A. Fernández-Mayoralas, J. J. Aragón. Non-invasive evaluation of intestinal lactase with 4-galactosylxylose: comparison with 3- and 2-galactosylxyloses and optimization of the method in rats. *Clin. Chem.*, 52 (2006) 270-277.
- F. Calderón, E. G. Doyagüez, A. Fernández-Mayoralas. Synthesis of azasugars through a proline-catalyzed reaction. *J. Org. Chem.*, 71 (2006) 6258-6261.
- I. García-Álvarez, G. Corrales, E. Doncel-Pérez, A. Muñoz, M. Nieto-Sampedro, A. Fernández-Mayoralas. Design and Synthesis of Glycoside Inhibitors of Glioma and Melanoma Growth. *J. Med. Chem.*, 50 (2007) 364-373.
- I. García-Álvarez, L. Garrido, A. Fernández-Mayoralas. Studies on uptake of glucose derivatives by red blood cells. *Chem MedChem.*, 2 (2007) 496-504.
- F. Freire, F. Calderón, J. M. Seco, A. Fernández-Mayoralas, E. Quínoa, R. Riguera. Relative and absolute stereochemistry of secondary/secondary diols: low temperature ^1H NMR of their bis-MPA esters. *J. Org. Chem.*, 72 (2007) 2297-2301.
- C. Hermida, G. Corrales, J. Cañada, J. J. Aragón, Alfonso Fernández-Mayoralas. Optimizing the enzymatic synthesis of β -D-galactopyranosyl-D-xyloses for their use in the evaluation of lactase activity in vivo. *Bioorg. Med. Chem.*, (2007), in press.

4. PATENTS

- A. Fernández-Mayoralas, M. Martín-Lomas. Nuevos procedimientos de obtención de 3-metilactosa utilizable para la evaluación de la lactasa intestinal. Nº 539908. Year: 1985. Assignee: CSIC. Countries: Spain.
- J. J. Aragón, G. Corrales, A. Fernández-Mayoralas, J. Jiménez-Barbero, M. Martín-Lomas, A. Rivera-Sagredo, D. Villanueva. Procedimiento de obtención de 4-O- β -D-galactopiranosil-D-xilosa utilizable para la evaluación diagnóstica de la lactasa intestinal. Nº 9001680. Year: 1990. Assignee: CSIC. Countries: Spain.
- F. F. Santos Benito, M. Nieto Sampedro, A. Fernández-Mayoralas, M. Martín Lomas. Oligosaccharides used for inhibiting the mitosis of astrocytes and tumoral cells of the nervous system, and methods for obtaining them. Nº 9102522. Year: 1991. Assignee: CSIC. Countries: Europe and USA.
- J. J. Aragón, F. J. Cañada, A. Fernández-Mayoralas, R. López, M. Martín-Lomas, y D. Villanueva. β -D-galactopyranosyl-D-xyloses used to evaluate the lactase activity, and enzymatic methods for obtaining them. la evaluación diagnóstica de la lactasa intestinal. Nº 9502185. Year: 1995. Assignee: CSIC-UAM. Countries: Europe and USA.
- F. J. Cañada, A. Fernández-Mayoralas, M. Martín-Lomas, E. Montero. Mejoras en el procedimiento de obtención de β -D-galactopiranosil-xilas utilizables para la evaluación diagnóstica de la lactasa intestinal. Nº: 9701156. Year: 1997. Assignee: CSIC-UAM. Countries: Spain.
- C. Fernández, A. Fernández-Mayoralas, J. A. Fontenla, O. Nieto, E. Rivas. Derivados de glicosil-diacil dopamina y sus sales como agentes potenciales de reposición de dopamina en cerebro y su

procedimiento de obtención. Nº: 9902827. Year: 1999. Assignee: CSIC-Univ. Santiago de Compostela. Countries: Spain.

E. García-Junceda, A. Fernández-Mayoralas, A. Bastida. Dominio soluble con actividad enzimática a 1,6-fucosiltransferasa de *Rhizobium* sp. Nº: 200001386. Year: 2000. Assignee: CSIC. Countries: Spain.

M. Bernabé, A. Fernández-Mayoralas, M. Nieto, J. Vaquero, M. Zurita. Glicósidos de N-acetil-6-O-[2,2-bis(hidroximetil)-3-hidroxipropil]-D-glucosamina, procedimiento de obtención y uso en el tratamiento de tumores cerebrales. Nº: 200000982 (PCT: ES01/00138). Year: 2000. Assignee: CSIC-Clinica Puerta de Hierro. Countries: Europe.

F. J. Cañada, G. Corrales, A. Fernández-Mayoralas, M. Martín-Lomas, Juan José Aragón. Un procedimiento enzimático para obtener 4-O- β -D-galactopiranosil-D-xilosa, 4-O- β -D-galactopiranosil-D-xilosa obtenida de acuerdo con el procedimiento, composiciones que la contienen y su uso en la evaluación de la lactasa intestinal. Nº: 200101419. Year: 2001. Assignee: CSIC-UAM. Countries: Spain.